

WHAT IS CLAIMED:

1. A fractional distillation process which comprises:

5 (a) passing a liquid comprising a first component and a second component onto an upper first tray located in a fractional distillation column containing a plurality of vertically spaced apart fractionation trays operated at fractionation conditions which cause vapor to rise through decking areas provided on the trays while liquid is collected in at least one downcomer forming part of each tray, with liquid which has been collected in a downcomer of the first tray exiting the downcomer through openings located in a lower portion of the downcomer;

10 (b) intercepting liquid, which is passing downward from said openings in the lower portion of the downcomer of the first tray, on a central portion of an antipenetration pan located under said openings and between the first tray and a lower, second tray, with the antipenetration pan comprising two arms extending away from the central portion and ending at points located at least one-half the width of the central portion away from said central portion; and,

15 (c) discharging a portion of the liquid which is intercepted by the central portion of the antipenetration pan onto the decking area of the second tray from each of the two arms of the antipenetration pan.

20 2. The process of Claim 1 further characterized in that a second portion of the liquid which is intercepted by the antipenetration pan is passed downward through openings in central portion of the antipenetration pan.

3. The process of Claim 2 further characterized in that liquid is discharged from the arms of the antipenetration pan in a direction substantially parallel to a downcomer of the second tray.

25 4. The process of Claim 1 further characterized in that the central portion and each of the two arms of the antipenetration pan are rectangular.

5. A fractional distillation process which comprises:

(a) passing a liquid comprising a first volatile compound and a second volatile compound downward through a fractional distillation column containing a plurality of vertically spaced apart multiple downcomer fractionation trays and operated at
5 fractionation conditions which cause vapor to rise through decking areas provided on the trays while liquid is collected in a trough-shaped downcomer present on each tray, with liquid which has been collected in said downcomer exiting the downcomer through grouped openings located in a lower portion of the downcomer;

(b) discharging descending liquid from the openings in the lower portion of the
10 downcomer of the upper first tray upon a plurality of antipenetration pans located between the first tray and a lower second tray, with the antipenetration pans comprising a central portion located under the grouped openings of the downcomer of the first tray; and

(c) discharging liquid from the central portion of the antipenetration pans onto
15 the decking area of the second tray and also discharging liquid onto the decking of the second tray from each of two arms which extend outward from the central portion of the antipenetration pan in directions parallel to a downcomer of the second tray.

6. The process of Claim 5 further characterized in that the number of antipenetration pans per tray is greater than the number of downcomers per tray.

20 7. The process of Claim 5 further characterized in that the downcomers of the second tray are substantially perpendicular to the downcomers of the first tray.

8. The process of Claim 5 further characterized in that at least one-third of the liquid which is discharged upon an antipenetration pan from the upper first tray is in turn discharged from the antipenetration pan via the two arms of the antipenetration pan.

25 9. An apparatus for performing fractional distillation in a fractionation column, which apparatus comprises:

5 (a) an upper first tray and a lower second tray, with both the first and second trays comprising at least one elongated downcomer and two vapor-liquid decking areas adjacent the downcomer, and with the downcomer of the first tray being oriented transverse to the downcomer of the second tray and having at least two groups of liquid outlets in the bottom of the downcomer; and,

10 (b) a plurality of antipenetration pans, with the antipenetration pans being mounted at an intermediate level between the downcomers of the first tray and the decking areas of the second tray, and being located under liquid outlets in the bottom of the downcomer of the first tray, the antipenetration pans having a shape which comprises
15 a central portion located under the liquid outlets of the downcomer of the first tray and two extensions aligned parallel with the decking areas of the second tray and reaching over portions of the decking area of the second tray which are not under a group of liquid outlets, whereby at least a first portion of liquid falling from the first tray onto the antipenetration pan is carried to portions of the decking area of the lower second tray
which are not under a group of liquid outlets while a second portion of the falling liquid is allowed to fall from the antipenetration pan onto a portion of the decking area of the second tray which is under the group of liquid outlets.

20 10. The apparatus of claim 9 further characterized in that each extension of the antipenetration pan has a length, measured between the ends to the extensions, equal to at least one and one-half times the width to the antipenetration pan.

11. The apparatus of claim 9 further characterized in that the liquid collection device is supported by stanchions attached to the lower second tray.

12. The apparatus of claim 9 further characterized in that the antipenetration pan is supported by attachment to the upper first tray.

25 13. An apparatus for performing fractional distillation in a fractionation column, which apparatus comprises:

(a) an upper first tray and a lower second tray, with both the first and second trays comprising at least two trough-shaped downcomers and at least one elongated

vapor-liquid decking area located between the downcomers, and with the downcomers of the first tray being oriented differently than the downcomers of the second tray, with the downcomers of each tray having at least two groups of spaced apart liquid outlets in the bottom of the downcomers; and,

- 5 (b) at least two antipenetration pans mounted between the bottom of the downcomers of the first tray and the top of the vapor-liquid decking area of the second tray, with one antipenetration pan being located under each of the groups of liquid outlets in the first tray, the antipenetration pans comprising a perforated horizontal first platform having a major axis perpendicular to the downcomers of the second tray and an
10 overlying generally U-shaped second platform attached to the first platform, the second platform having a major axis parallel to the downcomers of the second tray and ends located beyond the first platform.

14. The apparatus of claim 13 further characterized in that the first platform has raised end pieces parallel to the downcomers of the second tray.

- 15 15. The apparatus of claim 14 further characterized in that the length of the second platform is equal to 100 to 200 % of the length of the first platform.